

WE CLAIM AS OUR INVENTION:

1. A calibration apparatus for a resistance thermometer comprising:
 - a reference thermometer adapted for thermal interaction with a gas composition for generating a first reference temperature value for the gas composition at a first temperature; and
 - an acoustic meter adapted for acoustic interaction with said gas composition for obtaining an acoustic velocity-related measurement of said gas composition for use in generating a second reference temperature value for said gas composition at a second temperature.
2. An apparatus as claimed in claim 1 wherein said acoustic meter also obtains an acoustic velocity-related measurement for the gas composition at said first temperature also for use in generating the second reference temperature value.
3. A gas composition analyzer comprising:
 - a measurement cell having an interior adapted to receive a gas composition therein;
 - a resistance thermometer thermally coupled to the interior of said measurement cell;
 - an acoustic meter acoustically coupled to the interior of said cell for measuring a velocity of acoustic energy transmitted between components of said acoustic meter within said cell;
 - a reference thermometer thermally coupled to the interior of said cell for generating, during a calibration procedure, a first reference temperature value of said gas composition at a first temperature;
 - said acoustic meter being operable during said calibration procedure to obtain an acoustic velocity-related measurement in said gas composition in

said cell at a second temperature for use in generating a second reference temperature value; and

a calibration unit supplied with said first and second temperature values and said acoustic velocity-related measurement for determining a calibration relationship for the temperature thermometer from the first and second reference temperature values and from measurement values of the first and second temperatures supplied by the resistance thermometer.

4. An analyzer as claimed in claim 3 wherein said acoustic meter is operable during said calibration procedure to obtain a further acoustic velocity-related measurement of said gas composition in said cell at the first temperature, and wherein the calibration unit generates the second reference temperature value also using the further acoustic velocity-related measurement.

5. A method for calibrating a resistance thermometer comprising the steps of:

contemporaneously obtaining a first reference temperature value for a gas composition at a first temperature using a reference thermometer, and a first measurement temperature value of said gas composition using a resistance thermometer, and supplying said first reference temperature value and said first measurement temperature value to a calibration unit;

contemporaneously obtaining an acoustic velocity-related measurement value of said gas composition with an acoustic meter for use in determining a second reference temperature value, and obtaining a second measurement temperature value using the resistance thermometer,

and supplying said second reference temperature value and said second measurement temperature value to a calibration unit; and
in said calibration unit, determining a relationship from the first and second temperature values and the first and second measurement values, and calibrating said resistance thermometer using said relationship.

6. A method as claimed in claim 5 comprising the additional step of using the acoustic meter to obtain an acoustic velocity-related measurement at said first temperature for use in determining said second reference temperature value.